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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/715,376

11/19/2003

Jonathan Zanhong Sun

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MCGINN INTELLECTUAL PROPERTY LAW GROUP, PLLC
8321 OLD COURTHOUSE ROAD
SUITE 200
VIENNA, VA 22182-3817

EXAMINER

NGUYEN, THINH T

ART UNIT

PAPER NUMBER

2818

MAIL DATE

DELIVERY MODE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/715,376	Applicant(s) SUN ET AL.	
	Examiner THINH T. NGUYEN	Art Unit 2818	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 November 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25,30-34 and 37-40 is/are pending in the application.
- 4a) Of the above claim(s) 2-7,9-11,13-25 and 30-34 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,8,12,37-40 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED OFFICE ACTION

1. This is in response to Applicant Communication on 11/6/2007
2. Claims 1-27,30-34,37-40 are pending in the Application. Applicant has cancelled claims 26-29 and 35-36 and withdraws claims 2-7,9-11,13-25,30-34 from consideration as directed to non-elected inventions.

Claim Rejections - 35 USC § 103

3. The following is a quotation of U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The Examiner noted that claim 1 has some limitation recited in the preamble. A preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951).

5. Claim 1,8,37-38,40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Daughton et al. (US patent 6,744,086) in view of Chen et al. (US patent 5,917,747)

With regard to claim 1, Daughton 086 discloses (in the abstract, fig 4, fig 12, column 7 line 25-32,column 8 lines 5-10, column 9 line 55-62) a spin-current switched magnetic memory element, comprising: a plurality of magnetic layers, at least one of said plurality of magnetic layers having magnetic anisotropy component (the abstract line 2) and comprising a current-switchable magnetic moment(column 10 lines 4-11) ; and at least one barrier layer (fig 4, layer 5 ,column 4 line 25-26) formed adjacent to said plurality of magnetic layers.

Missing in the Daughton 086 disclosure is the specific wherein at least one of said plurality of magnetic layers having a perpendicular magnetic anisotropy component.

Chen 749 , however, disclose a magnetic memory cell wherein at least one of said plurality of magnetic layers having a perpendicular magnetic anisotropy component.(column 3 lines 24-29,column 4 lines 1-13)

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate this feature, as taught by Chen 749, into the device disclosed by Daughton 086 and come up with the invention of claim 1.

The rationale is as the following:

A person skilled in the art at the times the invention was made would have been motivated to improve the device by Daughton by making it to consume less power in both read and writing mode and reduce the switching field as suggested by Chen in column 2 lines 4-16 in order to make it a superior device Note that a reduced switching field will improve the MRAM

device in response to the high demand of the present electronic industry toward increasing micro-miniaturization.

With regard to claim 8, Daughton 086 (in fig 3 fig, 4) discloses a magnetic memory element comprising: first and second leads (fig 3 layer 3 and 9, fig 4 layer 24 and 27); and a pillar formed between said first and second leads, said pillar including said at least one barrier layer (fig 3 layer 5 ,fig 4 layer 15) and at least one magnetic layer of said plurality of magnetic layers.

The rationale as why claim 8 is obvious over Daughton 086 in view of Chen 749 has been set forth in the rejection of claim 1.

With regard to claim 37, Daughton 086 discloses a spin-current switched magnetic memory element, wherein said current-switchable magnetic moment is switchable via an electric current directly injected into said plurality of magnetic layers(column 10 lines 4-11,column 12 lines 40-67).

The rationale as why claim 37 is obvious over Daughton 086 in view of Chen 749 has been set forth in the rejection of claim 1.

With regard to claim 38, Daughton 086 discloses a spin-current switched magnetic memory element wherein said current-switchable magnetic moment is switchable via an interaction of a spin-polarized current and a magnetic moment of a magnetic layer in said plurality of magnetic layers (column 10 lines 4-11,column 12 lines 40-67)..

The rationale as why claim 38 is obvious over Daughton 086 in view of Chen 749 has been set forth in the rejection of claim 1.

With regard to claim 40 ,as set forth in the rejection of claim 1, the Combined Daughton 086 in view of Chen Discloses all the invention including a spin-current switched magnetic memory element, comprising: a plurality of magnetic layers comprising at least one magnetic layer having a magnetic moment that is switchable via an exchange of angular momentum between a spin-polarized current and a magnetic layer in said plurality of magnetic layers; at least one barrier layer formed (Daughton 086 fig 4, barrier layer 14 or 15) adjacent to said plurality of magnetic layers: ;--and wherein said plurality of magnetic layers includes_a perpendicular magnetic anisotropy component (Chen 749 lines 12-34) which -at least substantially offsets an easy-plane demagnetization effect in said plurality of magnetic layers

The rationale as why claim 40 is obvious over Daughton 086 in view of Chen 749 has been set forth in the rejection of claim 1.

6. Claim 12,39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Daughton et al. (US patent 6,744,086) in view of Chen et al. (US patent 5,917,747) and in further view of Nakada et al. (US patent 6,341,053).

With regard to claim 12, as set forth in the rejection of claim 8, the device named device of Daughton in view of Chen, disclose all the invention except for a lead or electrode that includes a magnetic layer. Nakada, however, (in fig 1,column 4 line 58-65) discloses a lead (layer 12) that can include a magnetic layer 13.

It would have been obvious to one of ordinary skill in the art the time the invention was made to incorporate a lead layer (layer 12) that can includes a magnetic layer as taught by

Nakada into the Daughton in view of Chen device and come up with the invention of claim 12 of the present Application.

The rationale is as the following:

A person skilled in the art at the time the invention was made would have been motivated to reduce the signal to noise ratio of the Daughton in view of Chen device as suggested by Nakada (See Nakada reference column 2 lines 14-15) in order to make it a superior one..

With regard to claim 39, Daughton 086 discloses a spin-current switched magnetic memory element wherein said current-switchable magnetic moment is switchable via an exchange of angular momentum between a spin-polarized current and a magnetic layer in said plurality of magnetic layers.

The rationale as why claim 39 is obvious over Daughton 086 in view of Chen 749 and in further view by Nakada 053 has been set forth in the rejection of claim 12.

7. When responding to the office action, Applicants are advised to provide the examiner with the line numbers and the page numbers in the application and/or references cited to assist the examiner to locate the appropriate paragraphs.

8. A shortened statutory period for response to this action is set to expire 3 (three) months and 0 (zero) day from the day of this letter. Failure to respond within the period for response will cause the application to be abandoned (see M.P.E.P. 710.02(b)).

CONCLUSION

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thinh T Nguyen whose telephone number is 571-272-1790.

The examiner can normally be reached on Monday-Friday 9:30am-6:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Loke can be reached at 571-272-1657.

The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval [PAIR] system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Thinh T. Nguyen/

Patent Examiner
Art Unit 2818